

the —  
**GLOXINIAN**

*The Journal for Gesneriad Growers*

Vol. 55, No. 2

Second Quarter 2005



**Petrocosmeas**

# American Gloxinia and Gesneriad Society, Inc.

*A non-profit membership corporation chartered by the State of Missouri*

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**Shows and Judging** — Ben Paternoster, 14 Coptor Ct., Huntington, NY 11743-2335 <ben9@optonline.net>

**Standing Rules** — Susan Grose, 4201 W. 99th St., Overland Park, KS 66207-3732 <sagrose@aol.com>

## INTEREST GROUPS

**Judging** — *Appraisal*, 3 issues, \$6. Send to Paul Susi, 10 Briarwood Lane, Millerton, NY 12546. (Subscribing to *Appraisal* is part of the responsibility of remaining an active judge.)

**Gesneriad Hybridizers Association** — *CrossWords*, 3 issues, \$8 (\$9 outside U.S.A.). Send to Martha Lacy, 260 Stoddards Wharf Rd., Gales Ferry, CT 06335 <wlacy@snet.net>.

**Newsletter Editors** — *Newsviews*, free to editors; \$6 subscription to others. Contact Leslie Milde, 373 Main St., P.O. Box 14, Fremont, NH 03044 <meribush@aol.com>

## FRIENDS AT LARGE

**Gesneriophiles Internet Discussion Group** — To join, visit the website <<http://lists.ibiblio.org/mailman/listinfo/gesneriophiles>> where you will find instructions for joining the list.

**British Streptocarpus Society** — <[www.streptocarpussociety.org.uk](http://www.streptocarpussociety.org.uk)> To join from the USA/Canada send \$10 check payable to Dale Martens, 1247 Island View Dr., Sherrard, Illinois 61281. To join from any other country, send £7 or 10£ to Don Corfield, 1019 Warwick Rd, Acocks Green, Birmingham, England, B27 6QJ.

**Marie Selby Botanical Gardens** — 811 South Palm Avenue, Sarasota, FL 34236 (914-366-5731) <[www.selby.org](http://www.selby.org)> Gardens open 364 days a year from 10:00 a.m. to 5:00 p.m. Admission fee; members free. Outdoor gardens, tropical display house, tree lab, al fresco lunch cafe, plant, book and gift shops.



# American Gloxinia and Gesneriad Society, Inc.

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*Second Quarter* ..... January 1  
*Third Quarter* ..... April 1  
*Fourth Quarter* ..... July 1

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**OBJECTS OF THE SOCIETY** — The objects of the American Gloxinia and Gesneriad Society, Inc. are to afford a convenient and beneficial association of persons interested in gesneriads, to stimulate a widespread interest in, and gather and publish reliable information about the identification, correct nomenclature, culture and propagation of gesneriads; and to encourage the origination and introduction of new cultivars.

**GESNERIAD REGISTRATION** — The American Gloxinia and Gesneriad Society, Inc. is the International Registration Authority for the names and cultivars of gesneriads excepting the genus *Saintpaulia*. Any person desiring to register a cultivar should contact Judy Becker, 432 Undermountain Road, Salisbury, CT 06068 <jbecker@mohawk.net>.

**AGGS Home Page:**  
**www.aggs.org**

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## COVER

Grouping of *Petrocosmeas*  
exhibited by various growers  
at the Toronto Gesneriad  
Society Show in April 2004.

# President's Message

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Susan Grose <sagrose@aol.com>  
4201 West 99th St., Overland Park, KS 66207

Dear Gesneriad Enthusiasts,

I am sitting in front of my computer and looking out my window at the most gorgeous aftermath of an ice storm and am grateful that I don't have to drive anywhere today. I so enjoy being able to have the company of my gesneriads on this kind of day. One of the few things I like about winter weather is that even though I can't garden outside, I can still enjoy potting, propagating, and admiring the wide variety of plants that make up the gesneriad family both on my windowsills and in my basement light garden. In the winter my south-facing living room window is lush with gesneriad greenery and some flowers, in contrast to the outside landscape which today consists of a mix of ice-covered shrub twigs and evergreen branches. *Columnnea* 'Christmas Carol' is in full bloom with bright red blossoms at just the right time of year.

Even though you will be receiving this letter long after the new calendar year, I have honored one of my personal Gesneriad New Years Resolutions and harvested and cleaned some gesneriad seed and mailed it to the Seed Fund. I hope you will do the same especially if you grow gesneriad species.

There is always something new going on with gesneriads in my collection. Lately, I happen to be especially fascinated with *Drymonias* that have patterned foliage. *Drymonia chiribogana* (my first *Drymonia*) was given to me in 1998 by Miriam Denham. It has never bloomed, but it has grown very attractive foliage under my fluorescent lights, and I have been happy with its foliage display. It does not readily branch and can grow quite tall on a sturdy stem. In fact, right now it is sitting on the floor next to a fluorescent light fixture because it has grown too tall to fit directly under the fixture. I have been waiting for a good time to pinch it back, root some tip cuttings, and repot it to see if I could get more branching. Imagine my surprise the other day when I noticed three large calyces on the stem at about 24 inches (60 cm) up the stem. I have no idea how long it will take for the blooms to open, but you can be certain I will be watching that plant closely from now on. Repotting from its 3-1/2" inch pot will be on hold now in hopes the blooms will open.

Now I am trying to figure out which one of my cultural practices spurred it to bloom. My basement, especially at the floor level, is fairly cool in the winter – about 55-60°F (13-16°C) until the lights come on. The other possible stimuli for bloom besides cool temperatures might be its age (six years old), being somewhat pot-bound, or a two-hour increase in day length in the middle of August when I increased my lights from 6 to 8 total hours per day in hopes that would encourage some of my plants to perform for my local chapter's flower show at the end of September. I do have some other plants that don't seem to mind this short light schedule. My *Smithianthas* are blooming, as well as some *Kohlerias*, *Chiritas*, and a few *Sinningias*. I do know that some plants will not bloom if the environment is too warm so maybe it is the cooler temperature or the temperature fluctuation on my basement floor which has "done the trick" this time. My fervent hope is that if the blooms do open, I will be able to set some seed to give to the Seed Fund. Now that would be exciting!



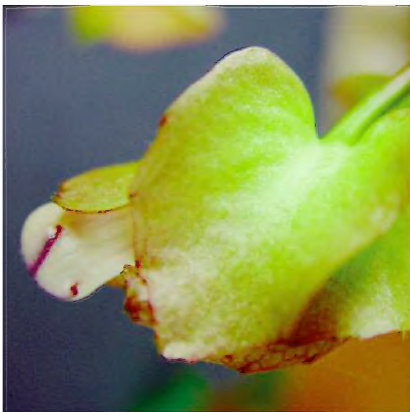
I know you will find the articles about *Petrocosmea* in this issue of THE GLOXINIAN fascinating. This genus has had a surge in popularity lately, and I know many people are interested in how to grow them well. I have only a few *Petrocosmea* plants and have only one suggestion of which I am sure many of you are already aware. Do not pinch out what you think might be suckers or extra crowns forming as they may actually be flower buds. I have a friend who is an excellent grower and a fastidious plant groomer who discovered that some of her *Petrocosmeas* never bloomed because she was constantly pinching out the nascent flower buds thinking they were suckers. Fortunately for me, I am not that prompt in my removal of suckers and have been lucky to have some plants bloom in my care despite the casual treatment some of them have received. I am not really advocating casual treatment, but do take care when removing what you think are suckers if you are having difficulty getting bloom on some *Petrocosmeas*.

I am sure that by now you have received the mailing containing the Pro and Con statements regarding the proposed Name Changes for our Society and Journal as well as a ballot and return envelope. As explained in the mailing, we decided it would be better for the members to receive all documents at the same time. A summary of comments is available on the AGGS website. If you haven't already mailed in your ballot, please be sure to vote by May 2nd – the deadline stated in the instructions. This is your Society, and we would like to hear from you.

I hope many of you will be able to attend our convention in Portland, Oregon in July. Please carefully read the Convention Program in the First Quarter issue of THE GLOXINIAN as there are some changes from previous years. I look forward to meeting first time convention-goers and to visiting with friends who are long-time attendees. Remember to register early, bring entries for the flower show, and come ready to have a great time learning more about gesneriads. I've gotten some of my best gesneriad growing tips at conventions.

*Susan*

About ten days after writing this message, my *Drymonia chiribogana* flowers opened one at a time! I think the blossom is pretty neat!



## American Gloxinia and Gesneriad Society, Inc.

49th Annual Convention – 2005

July 5 to July 10 – Portland, Oregon

### Call for 2005 Annual Membership Meeting

The Annual Meeting of the members of the American Gloxinia and Gesneriad Society will be held on Friday, July 8, at 12:15 p.m. for the purpose of transacting business that may properly come before the meeting.

### Call for 2005 Board of Directors Meeting

The Board of Directors will meet at the 49th Annual Convention for the purpose of transacting business that may properly come before the meeting. Board meetings will be held on Tuesday, July 5, at 1:00 p.m., on Friday, July 8, at 1:15 p.m., on Saturday, July 9, at 8:00 a.m., and on Sunday, July 10, at 9:00 a.m.

*Peter Shalit, Recording Secretary*

## Proposed Amendments to AGGS Bylaw

The AGGS Board of Directors established an Ad Hoc Committee to study the status of Affiliates of the Society. At the AGGS Board Meeting in July 2004, the Committee presented a Report and a proposed Bylaws Amendment, which the AGGS Board voted to approve. This Amendment will now be voted on by the AGGS Membership at the General Membership Meeting in July 2005 in Portland, Oregon.

### Affiliate Qualifications Proposed Amendment:

The current Bylaws state:

Article VII. Section 4. Affiliate Qualifications – Affiliates are groups of three or more members, but less than ten, of whom at least three (3) must be AGGS members, meeting at regular intervals, at least six (6) preferably more times a year, with meetings on gesneriad culture and related cultural methods, led by an AGGS member in good standing at the time of acceptance, the ultimate goal being to become a chapter by seeking new members and growing.

Motion: To replace in its entirety by the following:

Article VII. Section 4. Affiliate Qualifications – **Affiliates are existing groups of individuals, of which at least 20% are members in good standing of AGGS, meeting at regular intervals, with meetings on gesneriad culture and related cultural methods. Affiliates are required to maintain a yearly subscription to *The Gloxinian* and may post meeting and show dates on the AGGS website and have such information published in *The Gloxinian*. Affiliates do not enjoy any of the legal benefits afforded to chartered AGGS chapters (e.g., liability insurance coverage).**

The AGGS Board also established an Ad Hoc Committee to study possible changes in the name of the Society and its journal to better fit the interests, goals, and demographics of the Society. At the AGGS Board meeting in 2004, the Board voted to approve two proposed amendments to the AGGS Bylaws. One would change the name of our Society and another would change the name of our journal. Because of the significance of these potential changes, these measures will be put to a vote of the entire Membership by mail ballot rather than having a vote at the 2005 Convention Membership meeting which is typically attended by only about 10% of the Membership. All Members will receive a mailing with the text of the proposed amendments, "pro" and "con" statements written by interested parties, and a ballot for voting. The current relevant Bylaws passages and the proposed amendments are as follows:

### **Society Name Change Proposed Amendment:**

Current text:

Article I. Section 1. Name – This Society shall be known as the American Gloxinia and Gesneriad Society, Inc., organized for non-profit, hereinafter known as AGGS.

Motion: To amend Article I. Section 1. by striking out "American Gloxinia and Gesneriad Society" and inserting "The Gesneriad Society" and by striking out "hereinafter known as AGGS".

Article I. Section 1. would then read: **Name – This Society shall be known as The Gesneriad Society, Inc., organized for non-profit.**

It follows that "American Gloxinia and Gesneriad Society" and "AGGS" would be replaced by "The Gesneriad Society" or "The Society" wherever they appear in the Bylaws.

### **Publication Name Change Proposed Amendment:**

Current Text:

Article I. Section 3. Publications – The official publication of the Society shall be *The Gloxinian* magazine, which shall be mailed to all members of the Society.

Motion: To amend Article I. Section 3. by striking out "*The Gloxinian* magazine" and inserting "the journal *Gesneriads*".

Article I. Section 3. would then read: **Publications – The official publication of the Society shall be the journal *Gesneriads*, which shall be mailed to all members of the Society.**

It follows that "*The Gloxinian*" would be replaced with "*Gesneriads*" wherever the name of the journal appears in the Bylaws.

Respectfully submitted,  
*Peter Shalit, Recording Secretary*



# Seed Fund

Bob and Carol Connelly <Bob\_Connelly@email.msn.com>  
2391 Phillips Drive, Auburn Hills, MI 48326-2450

We have had a few months since installation of the new limits on seed orders, and we think it is going well so far. We have had only one order over the 25 packet limit, and that order requested enough de-listed seeds that it wound up under 25 packets. We really appreciate your help in this!

We are also seeing an increase in the donations. Please note that some of the additions in this issue are of varieties that we have recently removed from the list. Let's keep this trend up as we would hate to see these disappear from the seed list forever.

Another reminder, particularly for new AGGS members: our policy is not to accept email credit card orders for seed. We cannot be certain of the security of your credit card numbers sent through email, and it really saves us time if you send us a self-addressed envelope with your order.

We would like to thank the most recent contributors to the Seed Fund for their generosity: Marilyn Allen, Clay Anderson, Marlene Beam, Cynthia Chancy, Karyn Cichocki, Doreen Dragon, Ray Drew, Susan Grose, Robert Hall, Charles Hart, Leong Tuck-Lock, Sandy Officer, Bill Price, Carolyn Ripps, Vivian Scheans, Thad Scaggs, Peter Shalit, Lee Stradley, Jaco Truter, M. J. Tyler, Brian and Maureen Wilson.

## ADDITIONS

- *Briggsia aurantiaca* (A,R)
- *Briggsia speciosa* (A,R)
- *Henckelia incana* (LM)
- *Kohleria hirsuta* (LM)
- *Nematanthus fluminensis* (B)
- *Ramonda myconi* (A,R)
- *Sinningia* aff. *aggregata* (yellow) (M)
- *Sinningia* aff. *reitzii* 'Black Hill'
- *Smithiantha* hybrid mix (D,F,LM)
- *Streptocarpus confusus* ssp. *confusus* /Swaziland
- *Streptocarpus galpinii*
- *Streptocarpus haygarthii* /Inchanga, Kwazulu
- *Streptocarpus parviflorus* ssp. *parviflorus* /Limpopo Province
- *Streptocarpus rexii* × *S. gardenii*
- *Tremacron aurantiacum*
- denotes LIMITED quantities

## Seed Packets — \$1.50 each

### Please

- Make checks payable to the AGGS Seed Fund in U.S. funds
- To pay by credit card, send your credit card number, expiration date, and signature, and indicate if the card is Mastercard or Visa (\$6.00 minimum)
- Provide a self-addressed, stamped envelope (non-U.S. orders may include International Postal Coupons or have the postage added to their credit card bill)
- List alternate choices
- Include your membership number (first number on your mailing label)

### Note

- There is a limit of one seed packet of a single variety per order
- There is a limit of 25 seed packets per order
- There is a household limit of 50 seed packets per calendar year



## DELETIONS

<i>Chirita</i> (sp. 'New York' × <i>flavimaculata</i> ) × self	<i>Paliavana prasinata</i> × <i>Sinningia</i> <i>macropoda</i> MP944
<i>Codonanthe calcarata</i> 'Puyo'	<i>Paliavana prasinata</i> × <i>S. reitzii</i> MP949
<i>Codonanthe caribaea</i>	<i>Pentadenia manabiana</i>
<i>Columnnea oerstediana</i> GRF9423	<i>Phinaea multiflora</i>
<i>Columnnea schiedeana</i> (red reverse)	<i>Sinningia aggregata</i> AC1461
<i>Columnnea</i> sp. JLC5967	<i>Sinningia cooperi</i> AC1522
<i>Dalbergaria eburnea</i>	<i>Sinningia leucotricha</i> (larger flower)
<i>Epithema</i> sp. (North Perak)	<i>Sinningia macrorrhiza</i>
<i>Gloxinia nematanthodes</i>	<i>Sinningia macrostachya</i> MP262
<i>Nautilocalyx melittifolius</i>	<i>Sinningia</i> 'Doris' F3 × self
<i>Opithandra primuloides</i>	

### Nominating Committee Report

The following members have agreed to have their names put in nomination as directors for a three-year term ending in 2008:

Helen Bortvedt	Sequim, Washington
Tom Bruning	Council Bluffs, Iowa
Gussie Farrice	Staten Island, New York
Toshijiro Okuto	Kakogawa, Hyogo, Japan
R, David Harley	Urbana, Illinois
Carolyn Ripps	Hartsdale, New York
Vivian Scheans	Lake Oswego, Oregon

<i>AGGS Nominating Committee:</i>	<i>Carolyn Ripps, Chair</i> <i>Judy Becker</i> <i>Bob Clark</i>
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## The AGGS Auction

Paul Susi, Development Chair

**F**or this year's auction, we are asking for your donations of gesneriad or horticulturally related items to benefit the Elvin McDonald Research Endowment Fund. We are especially interested in live plant material – possibly one of your award-winning show plants? We all remember the generosity of several members at last year's convention who donated both show plants and new hybrids to the live auction.

At Saturday's luncheon we will be holding one live auction – a concentrated offering of excellent material. The silent auction will run its usual course, from Friday morning to just before the Saturday luncheon. If you are unable to attend convention, you can mail your donation to Vivian Scheans, 4660 Dogwood Drive, Lake Oswego, OR 97005 by June 30. Also, you can make a monetary contribution directly to the fund. Your check, made out to AGGS, should be sent to Helen Bortvedt, 20 Beeson Road, P.O. Box 2584, Sequim, WA 98382-8870. Questions about the auction can be addressed to Paul Susi, 10 Briarwood Lane, Millerton, NY <captaur@optonline.net>.

## Convention Dates to Remember

- April 15 Deadline for convention registration to enjoy early admission to the opening plant sale (Thursday, July 7 at 9:00 p.m.).
- June 1 Convention registration deadline. After this date, registration for activities will be on a space-available basis and subject to a \$25 late fee.
- June 5 Hotel registration deadline to guarantee convention room rate.
- June 15 Judging School registration deadline. Be reminded that no registrations will be accepted at convention.
- Deadline for artistic entry niche reservations, and for commercial and educational exhibit registrations.

**For registering online, visit the AGGS web site at  
[www.aggs.org/convention.html](http://www.aggs.org/convention.html)**



## Convention Updates

Due to the sudden illness of AGGS Convention Chair, Helen Freidberg, please contact the 2005 Local Convention Chair, Vivian Scheans (503-620-4426) <[vscheans@comcast.net](mailto:vscheans@comcast.net)>, for convention information.

Correction of email address for 2005 Flower Show Artistic Division design reservations (Sections K, L, M) and Commercial & Educational reservations (Sections R and S): Reservation requests must be sent to Shirley Nieminen <[sjnieminen@comcast.net](mailto:sjnieminen@comcast.net)>.



# It's "Reigning Gesneriads" in Portland, Oregon

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Vivian Scheans <vscheans@comcast.net>  
Local Convention Chair

Portland may be called the "City of Roses", but at the Embassy Suites Hotel early in July, gesneriads will be "Reigning". You're invited to join into the spirit of things to do with "Kings & Queens & Royalty" and dress for the occasion at the opening reception "Reigning Gesneriad-addicts" on Wednesday, July 6 from 5:30 to 6:30 p.m.

Hopefully, you can spend a few extra days when you come to the convention to see some of the Pacific Northwest. The Oregon/Washington Coast, the mountains (Mount Hood; Mt Saint Helens), or the valleys filled with nurseries and wineries, are just a few of the numerous things to see. We even have a few Indian casinos nearby, if you like that kind of thing. For those of you who like outdoor sports and activities such as camping, fishing, hiking, skiing, boating, and even wind surfing, the list is endless and you can find it here year-round.

## Convention Speakers

A very special thanks to Julie Mavity-Hudson for agreeing to be Speakers Chair at our Convention. We hope you will enjoy the speakers we've invited to talk about our favorite plant family and plants. We've changed the usual schedule a little so that all the people involved in judging our flower show will be able to attend the lectures this year.

**Toshijiro Okuto** – Lecture on Friday, July 9th at 2:00 p.m., "Playing with Streptocarpus".

Toshijiro Okuto is a horticulturist who worked for the Hyogo Flower Center in Japan and helped establish the gesneriad collection there. Some of the gesneriads from his collection can be seen online at Ron Myhr's Gesneriad Reference Web and at the AGGS website. While working at Hyogo, he became interested in hybridizing gesneriads, especially Streptocarpus. Ready-made hybrids of Streps all looked similar to him, despite the diversity in the species, so he tried to cross many species to create different types of hybrids. Unfortunately he was interrupted in this project when he was promoted to deputy-director and then director in his fifties. He recently retired from HFC and has started again to hybridize Streps and other gesneriads, not as a job but for fun.

**Dr. Eric H. Roalson, Ph.D.** – Lecture on Friday, July 9th at 4:15 p.m., "Reorganization of the Gloxineae Tribe based on Molecular and Morphological Datasets"

Dr. Roalson is currently an Assistant Professor in the School of Biological Sciences at Washington State University in Pullman, WA. He was a Postdoctoral Fellow in Molecular Evolution at the Smithsonian Institution.

New molecular and morphological studies in the Gloxinieae suggest that some genera should be excluded from the tribe and other genera need to be recircumscribed in order to accurately reflect evolutionary lineages. These studies will be outlined, including how morphology and historical classifications compare with these results, and the nomenclatural changes proposed.

**Ingrid Lindskog** – Lecture on Saturday, July 10th at 9:45 a.m., "Gesneriads in Houseplant Heaven (Sweden)" – Due to the long dark winters with outdoor gardens covered in snow or frozen for half the year, Swedes and other Scandinavians fill their homes with houseplants and spend enormous sums on them. Examples will be shown from homes, shops, and botanic gardens in Sweden.

Ingrid loved flowers better than people from the age of three when she moved from her birthplace in Stockholm to a small house at the edge of the woods south of town. Her main interest was wildflowers until family duties restricted her to a life mostly indoors, but close to botanic gardens. She soon found the apartment filled with Saintpaulias, the best survivors of her experiments. After founding the Swedish Saintpaulia Society in 1985, she turned to more interesting plants and in 1993 started a society for gesneriad enthusiasts – Gesneriasterna. At that time she also started the publication *Gesneriastnytt* and is still the editor today. Ingrid has a B.Sc. in chemistry, biochemistry, zoology, microbiology, Chinese and linguistics.

Ingrid shares her home, now in Umeå in northeast Sweden, with her husband and about 600 different gesneriads. When weather permits, she works outdoors in her garden and cultivates her large vegetable plot. She also enjoys spending time with her son and his family who live on the other side of town.

### **Gesneriad Hybridizers Association Speaker**

**Dale Martens** – lecture on July 8th after the GHA meeting at 8:00 p.m. In addition to the three convention programs described above, Dale Martens will lecture at the GHA meeting on Wednesday evening. Her program, titled "Sinningia Hybridizing Around the World", will show genetic dominance of certain traits in hybridizing species, calyx doubles, petal doubles, leaf variegation, and miniature Sinningias. Dale is co-editor of the GHA publication *CrossWords*.

### **Call for Volunteers**

Many AGGS members have expertise that could benefit our Society. If you are interested in working with one of the committees listed on the inside front cover of *THE GLOXINIAN*, please let us know. You may either contact a specific committee chair directly or you may contact Susan Grose, AGGS President, indicating your interests.



# Special Contributions

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Fay Wagman, Corresponding Secretary <fayw@aol.com>  
52 Harper Drive, Pittsford, NY 14534

## FRANCES BATCHELLER ENDOWMENT FUND — \$165

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## FUND FOR PROGRESS / COLOR PHOTO FUND — \$465

Fay Wagman, in memory of Nancy Maybloom  
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Jill Fischer, in lieu of speakers fee from Long Island Chapter  
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Dick Keene and Kathryn Brown  
Dee Dee Bundy, in memory of Alice Courage  
Ben Paternoster, in memory of Nellie Sleeth  
Ben Paternoster, in lieu of speakers fee from Sweetwater African  
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Friends of Fernwood Manor, with thanks to Lee Stradley and Dave  
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## In Memoriam

Edwina Palmer Varner

Fairview, North Carolina

## **Gesneriad Programs**

The programs in the AGGS slide library are a great, inexpensive way to bring the expertise of some of our most knowledgeable members to your local chapter. You can also see recently introduced species and hybrids that may not have made it to your area yet. Get hints on how to grow the plants by learning about their native habitat and how other people grow them. I'll be happy to answer any questions about specific programs.

These programs are currently available in 35 mm slide format:

- Introduction to Gesneriads (56 slides)
- Long Island NY: Convention 2004 Flower Show (check availability)
- Sacramento CA: Convention 2003 Flower Show (78 slides)
- Morristown NJ: Convention 2002 Flower Show (80 slides)
- Kansas City MO: Convention 2001 Flower Show (79 slides)
- Achimenes (59 slides)
- Alpine and Cool-Growing Gesneriads (78 slides)
- Chiritas (60 slides)
- The Companion Genera: Nemanthus and Codonanthe (77 slides)
- Kohlerias (72 slides)
- Sinningias (80 slides)
- Streptocarpus Species (75 slides)
- Streptocarpus Hybrids (79 slides)

These programs are available in PowerPoint Format on CD:

- Kohlerias (72 slides)
- The Companion Genera: Nemanthus and Codonanthe (77 slides)
- Long Island NY: Convention 2004 Flower Show

Programs can be reserved by mail to Dee Stewart, 1 No Name Road, Stow MA 01775-1604 or email to [dee.stewart@110.net](mailto:dee.stewart@110.net). Specify the program to be reserved and the date the program is required. Since new programs are very popular, it is helpful if you provide as much lead time as possible, provide alternate dates, or alternate programs that would be acceptable. Please specify the address the program is to be mailed to and a contact phone number. Program rental of \$20.00 US payable to AGGS must be received before the program can be shipped. Your request will be promptly acknowledged and programs will be shipped to arrive at least one week in advance of your reserved date. Programs on 35mm slides are shipped pre-loaded in a Kodak-compatible carousel. Programs must be returned within 5 days of your reservation date via Priority Mail with delivery confirmation in the U.S. or the equivalent postal category from outside the U.S.

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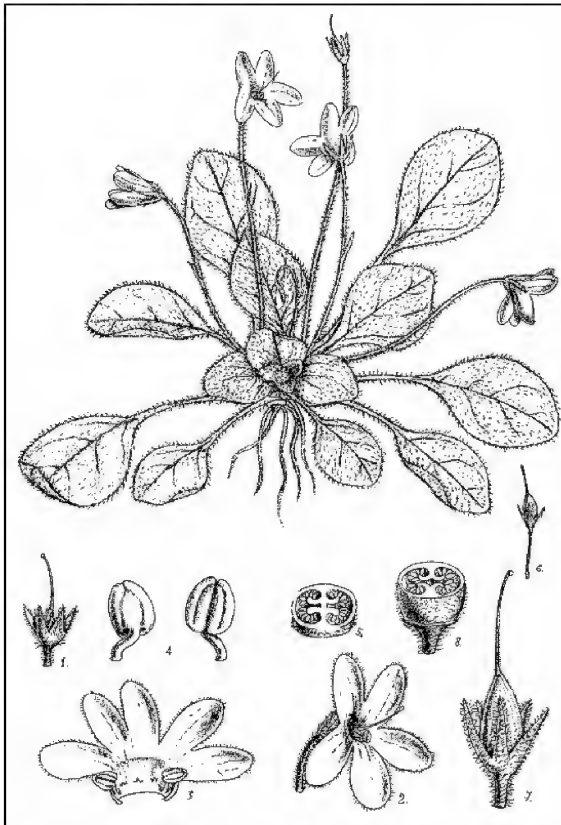
# "Pretty little plant on a rock":

## *Petrocosmea*

Laurence E. Skog <skogl@si.edu>

Department of Botany, Smithsonian Institution, Washington, DC  
Research Associate, Marie Selby Botanical Gardens, Sarasota, FL

In the mid 1880s, Dr. Augustin Henry discovered plants growing at the bottom of a small cave in southwestern China. Sending them to Kew he described them as pretty little plants on the surface of a rock. Daniel Oliver (1887) adapted this brief description to a scientific name in Latin based on the Greek words for "pretty" and "rock" and came up with *Petrocosmea*. The first publication of *Petrocosmea* included only one species: *P. sinensis* known from the western Chinese provinces of Hubei, Sichuan and Yunnan. Today we know of 28 species in *Petrocosmea*, of which 23 are endemic to China, where the genus is known in Pinyin as *shi hu die shu* (meaning "The Stone-Butterfly genus"). *Petrocosmea* also grows in NE India, Myanmar (Burma), Thailand, and southern Vietnam, and usually on shaded rocks in hilly areas at 400-1700 m.



*Petrocosmea sinensis* Oliv., the type species of the genus *Petrocosmea*, illustrated in 1887 in Hooker's Icon. Pl. 18, pl. 1716.



Seedlings of *Petrocosmea coerulea* growing in a rock crevice near Meng La, Yunnan, China. (photo by L.E. Skog)



*Petrocosmea forrestii* growing on a rockface near Kunming, Yunnan, China. (photo by L.E. Skog)

Plants of *Petrocosmea* often grow on limestone rocks in forests, and both at higher and lower elevations than *P. sinensis*. The more common species in cultivation grow natively at higher elevations, *P. nervosa* at 300-3100 m, *P. flaccida* at 2800-3100 m, and *P. kerrii* at 1500-3100 m, thus these plants may be grown in colder locations in your greenhouse or windowsill, and may even be hardy outside in sheltered settings.

*Petrocosmea* differs from the most similar genus *Opithandra* by the shorter corolla tube and the broader fruit, among other characters. The more closely related genera might be the small genus *Metapetrocosmea*, which differs primarily in the anther divergence, and the genera *Hemiboea* and *Hemiboeopsis*, which obviously differ from *Petrocosmea* because the plants have distinct stems differing from the stemless *Petrocosmea*. At first the genus was thought to be related to *Didymocarpus*, but the fruit was too broad to be put into the latter genus.

In the wild, *Petrocosmea* plants are stemless perennial herbs, terrestrial or growing on rocks, with leaves often densely covered with white hairs depending on the species. The corollas are usually blue to purple or white somewhat resembling flowers of *Saintpaulia* with two lobes up and three lobes down. Sometimes these lobes are equal or the upper lobes might be much shorter depending on the species. There are 2 stamens. The capsular fruits are straight and do not twist. The similarity to *Saintpaulia* encouraged the botanist Rodigas (1895) to transfer *Saintpaulia ionantha* to *Petrocosmea ionantha*, but later authors did not follow his lead.

Species of *Petrocosmea* were first grown in cultivation in England and Scotland, with the Indian species *P. parryorum* reaching the United States in 1956, according to Moore (1957). Because many of the species are relatively easy to grow, they have become very popular, and several species can now be found with growers in the U.S.

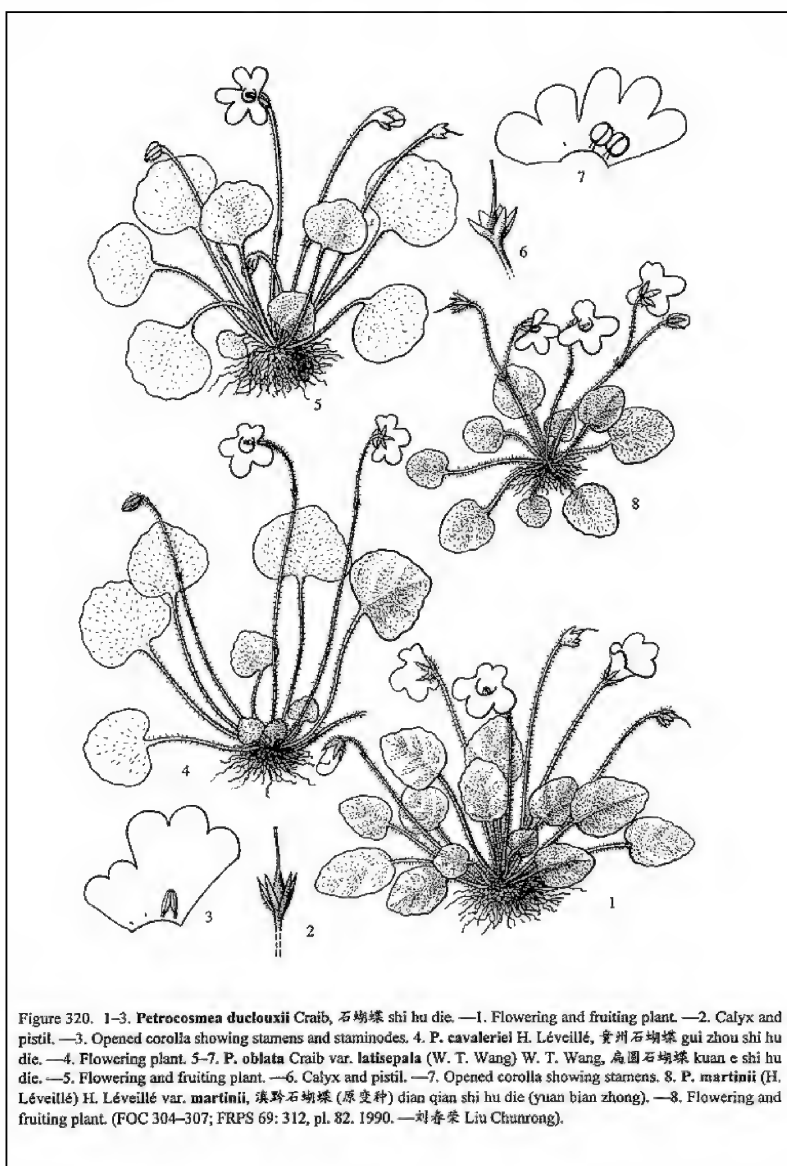


The 28 known species of *Petrocosmea* (with asterisked species believed to be in cultivation) and their native localities:

- \* *barbata* – Yunnan in China
- \* *begoniifolia* – Yunnan in China
- cavaleriei* – Guizhou in China
- coerulea* – Yunnan in China
- condorensis* – from the small island of Con Son off southern Vietnam
- confluens* – Guizhou in China
- \* *duclouxii* – Yunnan in China
- \* *flaccida* – Sichuan and Yunnan in China
- \* *formosa* – Thailand
- \* *forrestii* – Sichuan and Yunnan in China
- \* *grandiflora* – Yunnan in China
- \* *grandifolia* – Yunnan in China
- ioidioides* – Guangxi and Yunnan in China
- \* *kerrii* with two varieties (var. *kerrii* and var. *crinita*) – Yunnan in China, Myanmar (Burma) and Thailand
- kingii* – Myanmar (Burma)
- longipedicellata* – Yunnan in China
- mairei* with two varieties (var. *mairei* and var. *intraglabra*) – Sichuan and Yunnan in China
- martinii* with two varieties (var. *martinii* and var. *leiandra*) – Sichuan and Yunnan in China
- \* *menglianensis* – Yunnan in China
- \* *minor* – Yunnan in China
- \* *nervosa* – Sichuan and Yunnan in China
- oblata* with two varieties (var. *oblata* and var. *latisepala*) – Guizhou and Yunnan in China
- \* *parryorum* – from Assam in India and Myanmar (Burma)
- qinlingensis* – Shaanxi in China
- \* *rosettifolia* – Yunnan in China
- \* *sericea* – Yunnan in China
- sichuanensis* – Sichuan in China
- sinensis* – Hubei, Sichuan and Yunnan in China

#### **Selected references:**

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- Oliver, D. 1887. *Petrocosmea sinensis* Oliv. Hooker's Icon. Pl. 18: pl. 1716.
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- Wang, Wentsai. 1985. The second revision of the genus *Petrocosmea* (Gesneriaceae). Acta Bot. Yunnan. 7: 49-68.
- Wang Wentsai, et al. 1998. *Petrocosmea*, pp. 302-308, in Wu Zheng-yi & P.H. Raven, Flora of China, volume 18 (Scrophulariaceae through Gesneriaceae). Science Press (Beijing) and Missouri Botanical Garden Press (St. Louis).



Page 19 opposite: Photos of the first four species of *Petrocosmea*  
grown in the U.S. in the late 1900's.



*Petrocosmea parryorum* grown by Maryjane Evans(photo by John Evans)



*Petrocosmea nervosa*  
(photo by Bob Stewart)



*Petrocosmea flaccida* grown  
by Carolyn Conlin-Lane  
(photo by Michael Riley)



*Petrocosmea kerrii* grown by Maryjane Evans (photo by John Evans)



# Petrocosmeas in England

Ray Drew <raydrew@blueyonder.co.uk>  
17 Roberts Road, Laindon, Essex, England USS15 6AY

As an active member of the Alpine Garden Society, I am particularly interested in gesneriads that are native to relatively temperate (usually alpine) locations and are sufficiently hardy to tolerate at least several degrees of frost. These are known collectively as the "alpine gesneriads". Stretch the terms "temperate" and "alpine" a little, and you end up with "sub-alpine gesneriads", referring to those that may come from lower elevations and generally benefit from protection from the worst of our extremes of climate.

By far the most accommodating genus that I grow is *Petrocosmea*. The typical tightly adpressed, symmetrical rosettes, sometimes overlaid with a pelt of silky hair, make them attractive both in and out of flower. Several have now appeared on the Alpine Garden Society show bench, and vegetative propagations (from leaf cuttings primarily) are filtering into general circulation. To single out individuals is difficult as all have their own charms, but *P. duclouxii* is probably at the top of the "most desirable" list. Coming from shaded rocks in hilly regions in central Yunnan (most recognised species are native to China), it has already survived several nights (under cold glass) at  $-2^{\circ}\text{C}$  ( $28^{\circ}\text{F}$ ). Following closely behind are *P. minor*, with glossy, deep green leaves and blue/purple flowers like bunches of little Samurai helmets that are often at their best in mid-autumn, and *P. ? rosettifolia* – the question mark illustrating the state of naming at present. This species with pure white flowers is distinctive in the way the lower three petals predominate to form a generous lip.

*Petrocosmea kerrii* is certainly the most established species this side of the pond. Doris Saunders was awarded a Preliminary Commendation by the RHS Joint Rock Committee for a plant shown as long ago as 1949; and this rather undistinguished stock, sometimes recommended for its foliage rather than its bunched, slightly misshapen flowers, has done perfunctory duty for the species in British gardens until quite recently. Bleddyn and Sue Wynn-Jones (Crûg Farm Plants, Gwynedd, UK) have introduced far superior, hardier, larger-flowered representatives from Vietnam and northern Thailand. From Doi Phohom-Pok, a 2280 m mountain in Thailand, they have distributed a particularly fine selection under the collection number BSWJ6634 which they encountered growing as an epiphyte on tree trunks close to the summit. It flowers from late spring through to the end of summer and produces numerous rosettes, yielding a display nothing short of spectacular. Growing not far away on the same mountain in Thailand is the narrowly tubular, yellow-flowered *Ancyclostemon convexus*. It also is currently being offered by the same nursery, one of the few British sources of an interesting range of hardy and near-hardy gesneriads.

A close relative and looking like a dwarf form in many respects, *Petrocosmea formosa* is a singularly attractive species from northwestern Thailand. The disproportionately large flowers, 3 cm across when fully developed and pale lilac-pink with a white centre and an egg-yolk moustache, stand proud of the small, felted podium of leaves.

Many plants are arriving from abroad which do not neatly fit into recognised species – they merely default to the closest description. Irrespective of

the taxon concerned, they usually send up occasional bursts of flowers throughout the year but tend to peak in late summer to early autumn. The majority are somewhat slow growing and seasonal in their active growing period. Some, like *Petrocosmea nervosa* which is sometimes considered a cool greenhouse plant yet experiences snow and frost in southwestern China, actually shrink to a dormant resting bud in winter. Don't be alarmed if the outer leaves start to yellow, dry and wither – they should! The ecology of such plants has long been known to plant geographers and explorers, if not to gardeners, who are apt to mutter that they "look tender". *Petrocosmea parryorum*, collected in 1925 by the eponymous Mr. and Mrs. Parry in the Lushai Hills (Assam) at 1600 m, was found growing alongside begonias on moss-covered rocks, saturated for part of the year; perhaps surprisingly, winter frosts were commonplace.

## CULTIVATION

**Temperature and climate considerations** — Sub-alpine gesneriads are fairly straightforward to grow if a few simple rules are followed. They should be kept just frost-free in winter; at most they should only be allowed to take one or two degrees of frost and only then if they are on the dry side. I am almost certain that this drop in temperature helps to achieve better flowering. The hope is that some will eventually prove to be sufficiently hardy to adapt at least to alpine house conditions and possibly selected spots in the open garden. At present, however, experimentation with these newer plants is still in its infancy.

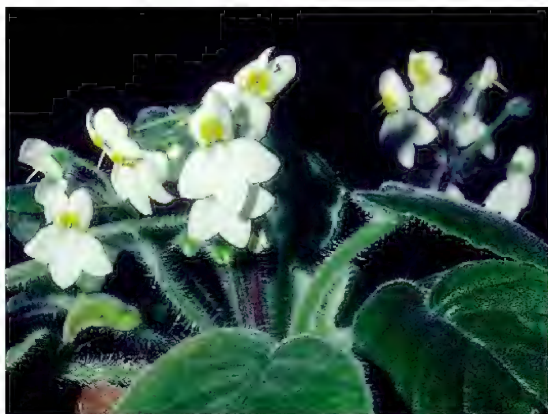
Common to most of the genus is a dislike of direct sunlight; if exposed to this, the leaves start to lose their normal coloration and appearance, some crisping at the edges. My healthiest plants respond to light shading and an average humidity of 50–70%; this keeps the leaves cool and helps to instill a healthy vitality. Constant air circulation is provided by means of a small electric fan; a helpful adjunct, but I'm sure this is far from essential.

**Growing medium** — It seems to be a common misconception, certainly in the UK, that gesneriads need an acid soil to thrive. I can understand this assumption, but it is far from true. Overall, a mix of equal parts loam, gritty sand, peat, perlite, and fine bark will work well. This constitutes a growing medium that is loose and porous enough to retain moisture, yet provides good drainage. But be warned – the mix used must be compatible with your particular growing environment and watering habits. As the plant increases in size, it becomes increasingly important to top-dress the soil with a suitable material. The primary purpose of this is to keep the outer (and therefore older) leaves out of contact with the potentially damp soil surface. This helps to avoid rotting of the underside of these leaves. Individually this does not greatly harm the plant, but the overall symmetry is spoiled. I use 6mm crushed grit below the rosettes, replacing the outer, visible rim with fine bark or sphagnum moss which is more aesthetically pleasing for exhibiting purposes.

**Pots** — I grow almost exclusively in plastic pots, by which I mean my general collection, gesneriads included. This is not because I think it is better or worse for the plant but because I have adapted my growing techniques to this type of container. Most gesneriads much prefer to be under, rather than over-potted (reflecting their predominantly crevice-dwelling habitats), promoting a more floriferous plant that, if desired, can be double-potted into a more suitable container for exhibition purposes.



*Petrocosmea grandiflora* (grown and photographed by Ray Drew)



*Petrocosmea kerrii* (grown and photographed by Ray Drew)



*Petrocosmea minor* (grown and photographed by Ray Drew)





*Petrocosmea nervosa*  
(grown by M. Evans)



*Petrocosmea kerrii*  
(grown by R. Drew)



*Petrocosmea parryorum*  
(grown by M. Evans)



*Petrocosmea grandiflora*  
(grown by W. Price)



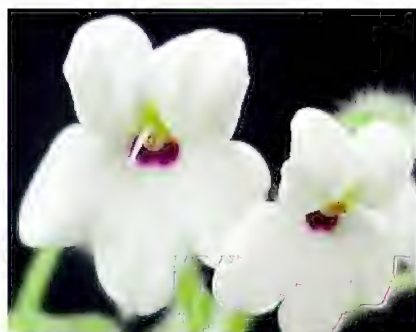
*Petrocosmea minor*  
(grown by M. Evans)



*Petrocosmea formosa*  
(grown by M. Evans)



*Petrocosmea begoniifolia*  
(grown by T. Okuto)



*Petrocosmea grandifolia*  
(grown by R. Drew)

Editor's Note: In the last decade, many new *Petrocosmeas* have been brought into cultivation around the world; however, proper identifications for some of the species (*P. duclouxii*, *P. rosettifolia*, *P. grandiflora*, among others) are still in question. Photographs and growers' comments in this issue are based on currently used names, some of which may be updated in the near future. Many thanks to Peter Shalit and Bob Clark for their coordination assistance, and to all the writers, growers and photographers who made this special issue possible. *J.K.*

**Food and drink** — Using the medium mentioned above, the average plant will need to be watered fairly infrequently. A good indicator is the stiffness of the leaves – only give water when the turgidity drops (i.e., when the leaves start to feel a little floppy). I do not wick any plants. Many species strongly dislike moisture lying on the foliage for any length of time and will rot easily, especially during winter and early spring. A counsel of perfection would be always to water from below; however, there is evidence that some benefits are gained from a little foliar feeding from time to time, though go very light on fertilizer dosages! I have shifted to a constant feeding regime for most of my pot-grown gesneriads, using any good 20-20-20 or 15-30-15 (phosphorus pentoxide/nitrogen/potassium) fertilizer. Use one-quarter the strength recommended on the label directions and use at this rate of dilution every time you water your plants. Bear in mind that many gesneriads are slow growers, so extra fertiliser is wasted or collects and may even damage the roots. This being the case, every third or fourth watering use plain water (preferably rainwater) to flush out accumulated salts.

## PROPAGATION

Depending on the material I am dealing with, I use one or more of the techniques outlined below. In each case, additional heating and lighting are helpful. While far from necessary, they speed the process along and overcome seasonal variations in temperature and natural lighting. For this purpose, an area of about 18" square of greenhouse staging has been modified into a propagating frame. Using a sub-soil heating cable with a thermostatic controller, I aim to maintain a temperature of around 18°C (64°F). Ambient temperature has an effect on this throughout the year. (I realise some folks will have trouble getting down to this temperature!)

Some 45 cm above this frame I have suspended an ordinary 100-watt light bulb, linked to a timer which supplies 12 hours of supplementary lighting (8:00 a.m. to 8:00 p.m.) every day. This makes it possible to propagate plants with equal success all year round. One propagating medium is used for all three methods, viz., equal parts of fine (sifted) peat; perlite and silver sand.

**Growing from seed** — Gesneriad seed is very fine and dust-like. Empirical observation suggests that it has a long shelf life if stored correctly, so seed from horticultural societies' annual distributions should prove to be a viable proposition. I prefer to use the afore-mentioned medium but have also used live sphagnum with success. In both cases the pots were sown prior to watering, then stood in rainwater until the surface of the mix looked damp or (in the case of the sphagnum) for about 10 minutes. This has the affect of drawing the seed down onto the medium and also avoids disturbing the surface. It is best not to cover the seed with seed compost as this appears to retard germination. Despite their often-shady niches, the seed of these plants is light sensitive and equally responsive to a combination of warmth and humidity.

The sown pots are placed individually in sealed plastic bags to preserve humidity and then are transferred to the propagating frame. The seed can germinate in anything from a few days to a few months after which further development is a slow process. Individual seedlings can be pricked out into community pots (i.e., grown on in massed plantings rather than pricked out individually) as soon as they are big enough to handle. I prefer to leave them together until several leaves have developed and then prick out four or five seedlings into 3" pots using my normal growing medium and regime.

**Side rosettes** — Most if not all of the species covered here produce side rosettes. Some, like *Petrocosmea kerrii*, produce these in abundance. They are easily removed with a sharp knife or scalpel (obtainable from a craft shop). After planting and watering them, seal the side rosettes in a plastic bag and then place them under the light in the heated frame treating them like seed-sown pots. If possible, this is the best method of propagation as it not only allows for the selection of good clones, but also helps to maintain the symmetry of the parent plant.

**Leaf cuttings** — This is by far the easiest method of propagating rosette-forming types but may be used with equal success for most other gesneriads as well. Mature leaves are removed close to the point where they join the stem or body of the plant. Strong, healthy leaves should be selected where possible; but if leaves of a rare specimen are detached by accident, then even if they are damaged or moribund, it is always worth giving them a try. There is a school of thought that insists it is necessary to include the part where the petiole joins the stem, otherwise a non-flowering plant will result. In all probability this is an old wives' tale since this has not been the case with any of the species that I have tried.

The process is very easy. Using a pot half filled with the (damp) propagating medium described above, make a series of shallow holes against the inside rim (which encourages roots to grow downwards rather than outwards) and insert the petioles, firming the medium as you go. It is possible to use the top half of a leaf (cut horizontally) instead of the petiole. This is treated in exactly the same way. Water and seal the leaf cuttings in a plastic bag before placing them under the light in the heated frame as for seed-sown



*Petrocosmea* leaves rooting in a tray (cover removed)





Petrocosmea plantlets growing from rooted leaves

pots. Roots usually develop in 8-10 weeks; but even after plantlets form, they will need at least three or four months before they can be confidently transplanted into the final growing medium. Sometimes a number of plantlets will be formed around one leaf cutting. Rather than being greedy and dividing these straight away, it is best to leave these as a group until they are considerably older before separating them out.

### THE FUTURE ...

With new material constantly arriving, especially from China, along with a definite buzz of interest in the Gesneriaceae as a whole, I am sure some stunning plants will be adorning the show benches in the not too distant future. Availability has improved immeasurably in the past decade, with just a few British nurseries offering newly introduced material, and at least one Chinese source (Chenyi/Kaichen) providing material which has since been propagated in the United Kingdom, and distributed. The ease of propagation should soon make presently uncommon plants available to those who wish to try them. This increase of available material will also allow for wider experimentation – in all probability, trying plants in different places will reveal presently little-grown species, now coddled in protected sanctums, as suitable candidates for the average grower.

*(An earlier version of this article was first published in the September 2003 issue of the Alpine Garden Society's "The Alpine Gardener".)*

### Color Photo Sponsorships

- Cover photo sponsored by the Puget Sound Gesneriad Society in memory of valued members recently lost:  
Katherine Isabella Brown, Nellie D. Sleeth, Richard Leslie Keene
- Photos on page 5 sponsored by Susan Grose

# THE GLOXINIAN

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Volume 54

Numbers 1-4

Compiled by Judy Becker

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Plant illustrations are indicated by an asterisk (\*)

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# Petrocosmeas: Growing Them My Way

Paul F. Kroll <pfkroll@worldnet.att.net>  
4325 Two Rod Rd., East Aurora, NY 14052

Since my collection of *Petrocosmeas* was awarded at the 2004 AGGS Convention on Long Island, I have received many questions about how I grow them and how they grow for me. No matter how a plant or plant family is treated, some grow well and some do not. This has been true for me over the years, and there are some plants that refuse to grow under my conditions. Every grower's conditions vary and one needs to study the requirements and provide the proper conditions to achieve success.

My first experience with the genus *Petrocosmea* was with *P. nervosa*. It grew well for me along with my *Saintpaulia* species and hybrids, under the same conditions. I know several growers of *Saintpaulias* who refuse to give *Petrocosmeas* a try since their centers are so tight it frightens them to think these plants might have cyclamen mites! This type of growth is quite typical, although some of the species do not have quite that same tightness in their centers.

I was able to add *Petrocosmea flaccida* to my collection soon after acquiring *P. nervosa*, and I found it to be considerably more free flowering. They look very much the same. A hybrid that looks like those two is *P. 'Momo'*. It also is a much more free-flowering plant. Most *Petrocosmeas* grow beautifully symmetrical all year round. They seem to bloom for me from August through December. This may be due to the cooling of the weather and my growing area, or perhaps it is their seasonal time to bloom, I do not know.



Paul Kroll's *Petrocosmea* Collection from the 2004 Convention Flower Show: (clockwise) *P. kerrii*, *P. minor*, *P. begoniifolia*, *P. forrestii*, *P. parryorum* (photo by Dale Martens)

All my growing is done in the basement. Temperatures vary from 65°F in the winter to 80°F in the summer. I grow under two-tube fluorescent fixtures and the tubes are eight to twelve inches above the foliage of the *Petrocosmeas*. I use potting soil, peat moss, vermiculite, perlite and charcoal in my soil recipe. It tests at 6.8 pH. This is the soil I use for the *Petrocosmeas*. I water from the top and also in individual saucers with tepid water which tests (or is "doctored") to 6.8 pH. I add chemical fertilizers, rotating three different formulas at one-quarter strength, along with a drop of Superthrive per gallon of water. I do not wick water at all. *Petrocosmeas* are quite shallow rooted, and I grow them in shallow azalea pots or bulb pans. They seem to grow into whichever pot size they are given, although most of mine are kept in pots from 2 to 3 inches. Here is my review of each of the species I grow along with information on the size to which they have grown for me.

*Petrocosmea barbata*, *duclouxii* (the "real" one), *flaccida*, *formosa*, *forestii*, *nervosa*, and *rosettifolia* all grow with the same flat rosette habit for me. They will put out "pups" at their base, near the soil line and these can be readily plucked off to start new plants and share with other growers. Beware that not all the fuzzy little shoots that the plant may put out at its base are sucker shoots; some may be buds! These species have all grown well and most have bloomed in pots no larger than three inches under my conditions.

Perhaps this might be the time to mention that a plant labeled *Petrocosmea vittatae* was grown and distributed around a few years ago. Maryjane Evans' curiosity was piqued and she did considerable research on this supposed-species of *Petrocosmea*. There is no evidence that this plant is a distinct species. The one I grew had the exact same appearance as *P. flaccida* and the other look-alikes.

*Petrocosmea begoniifolia*, *minor* and *sericea* have grown up to seven or eight inches in a 5" bulb pan. They also grow in the typical flat, symmetrical rosette pattern.

*Petrocosmea kerrii* grows in the rosette pattern, but has longer petioles and more upright growth. *P. parryorum* grows this way as well. Although I have not yet bloomed *P. parryorum*, I was successful in blooming *P. kerrii* once I stopped removing the curious fuzzy shoots at its base, thinking incorrectly that they were suckers. *Petrocosmea kerrii* blooms from its base, and those fuzzy shoots were actually the buds. These two species have grown well in 4" pots and filled them quite nicely.

Ingrid Lindskog gave me a leaf each of *Petrocosmea* sp. #4 and sp. #5 (from China) at the AGGS 2001 Convention. They both grew successfully, and sp. #4 seems to have evolved into *P. rosettifolia*. I have no positive identity as yet on sp. #5. It appears quite unlike any of the others I am presently growing, with the exception of its flat rosette appearance. Bill Price has recently exhibited sp. #5 that does not look at all like the one I have labeled the same at home.

Speaking of differences, I have seen a plant of *Petrocosmea minor* grown by Karyn Cichocki which has marked veining in its leaves as opposed to the perfectly smooth leaves of the one we normally see in shows. This may be one to watch and perhaps will become a different clone in time. I also have a leaf of *Petrocosmea* sp. HT2 that was given to me by Bill Price. It is putting up babies now, but I cannot yet comment on it.



I use gesneriads exclusively in the execution of my container gardens and have used small plantlets of several of the *Petrocosmea* species in them. The plants seem to thrive under the extremely humid conditions of a terrarium and also under the conditions of a plastic-bag type of terrarium that I use to keep my natural gardens and dish gardens looking nice for an extended period of time. The natural garden I entered in the Long Island Convention flower show last July had two plants of *P. forrestii* in it; and when I took that garden apart in September, each of those plants had grown to over six inches across! Apparently they loved the humidity since all other conditions were exactly the same as their potted cousins nearby on the same shelf.

*Petrocosmeas* seem to have taken a serious hold on gesneriad growers over the past few years. Give them a try in your plant collection.



Paul Kroll's natural planting, including two plants of *Petrocosmea forrestii*, exhibited at Convention 2004 Flower Show (photo by Dale Martens)

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*Petrocosmea begoniifolia*  
grown by Paul Kroll  
(photo by K. Cichocki)



*Petrocosmea formosa*  
grown by Maryjane Evans  
(photo by John Evans)



Two forms of *Petrocosmea minor*  
(grown and photographed by Karyn Cichocki)

# Petrocosmeas in New Jersey

---

Karyn Cichocki <kc@middletonins.com>  
79 Beaver Run Road, Lafayette, NJ 07848

**M**y first *Petrocosmea* was *P. parryorum*. I guess it was beginner's luck but I managed to have it bloom for me after a year. I can remember Maryjane Evans asking what I had done to get it to bloom and I replied "nothing special". I grow in my unheated basement where the temperatures are fairly cool during the summer and in the mid to high 50°F range in the winter. Shortly after it finished blooming, the plant died. This is the one *Petrocosmea* that I now have trouble with. It will grow nicely and then just go downhill all of a sudden.

The second *Petrocosmea* that I acquired was *P. flaccida*. The leaves with their silvery hairs and the purple blossoms that reminded me of a wild viola fascinated me. Once bitten by the genus, I just had to have more. The plants that I am currently growing are: *P. barbata*, *begoniifolia*, *duclouxii*, *flaccida*, *formosa*, *forrestii*, *kerrii*, *minor*, *minor* with leaves that resemble a holly leaf, 'Momo' (the only hybrid to date), *nervosa*, *parryorum*, *rosettifolia*, *sericea* and HT2 (a plant that I received from Maryjane Evans' collection). I just received a leaf from Bill Price of his *Petrocosmea* sp. #5 which has a leaf similar to that of *P. minor*.

**Soil** – I use a soilless mix of the New Zealand sphagnum moss pellets that I reconstitute with hot water. This is sterilized for one hour in an oven set at 250°F. I then make up the mix using one part each of the moss, milled peat moss (that is also moistened and sterilized), coarse perlite and coarse vermiculite. This creates a very nice light soil that holds moisture quite well without staying too soggy.

**Pots** – I like to use the 5" pan pots as these plants seem to like the shallow pots better than taller ones. So far my plants have not outgrown this size.

**Light** – I have three plant stands in the basement where I grow the bulk of my collection. They all have four-foot fixtures, one with two-tube fixtures and one with four-tube fixtures. I have most of the plants growing off to the sides of the stands except for *P. rosettifolia*, *flaccida*, *forrestii*, 'Momo' and *nervosa*, which are growing under the two-tube fixtures. The lights are on for 10 hours per day all year round. I have them set to come on during the evening as I find this warms the area up during the winter and keeps it cool during the summer.

**Fertilizer** – I am using MiracleGro tomato fertilizer, 1/8 teaspoon to a gallon of water. I have well water with a pH close to 8 and this fertilizer brings it down to the 6.5-7 range. I use plain water every third watering.

**Temperature** – Summer temperatures are in the 65-75°F area, and winter temperatures range from 54-62°F. Of course, these will go up or down depending on the outside temperatures. I have an average of 50% humidity.

## Some observations –

I have found that *Petrocosmeas* do not like to have their roots disturbed, and that it is best to plant them in a pot that they can grow into. Of course this requires patience while waiting for the plant to fill out the pot.

Leaves of *Petrocosmea minor* and *P. sericea* can get damaged easily if cold water or water with too much fertilizer gets on them. I have even seen a plant with leaves that were heavily damaged just from rainfall.

Most grow into a nice rosette form with little training or grooming, but some will get ratty looking after blooming.

*Petrocosmea sericea*, *P. rosettifolia*, and HT2 have not bloomed for me yet. I just acquired *P. duclouxii* in the live auction at the New York State African Violet Society Convention so I don't have much experience growing that species yet.

I have little trouble propagating *Petrocosmea minor*, *begoniifolia*, *rosettifolia*, *flaccida*, *forrestii*, and *barbata* from leaves, but I have trouble with *P. nervosa*, *sericea*, and *parryorum*. I seem to have better success using a mix of equal parts vermiculite and perlite, lightly moistened and in a container with a top.

The original plant of *Petrocosmea formosa* that I received from Maryjane had a much different growth habit than that of the plant labeled with the same name being sold by Lyndon Lyon Greenhouses. My plant has small leaves that grow in a tight bunch. They start to grow out when the blossoms start to develop. The flowers are the same but smaller. I bought a plant from Lyon's to see if it was just my growing conditions, but these plants seem to be either different clones or different species.

Although most of the plants have dark to light lavender flowers, *Petrocosmea begoniifolia* has creamy yellow ones, *P. barbata* has almost white to pale lavender ones, and *P. formosa* has two-tone blossoms with the top lobes light lavender to almost white and the lower lobes a medium shade of lavender with a yellow eye.

Petrocosmeas are wonderful plants and are fairly easy to grow.

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*Petrocosmea barbata*  
(grown and photographed by Karyn Cichocki)



*Petrocosmea forrestii* grown by Maryjane Evans  
(photo by John Evans)



*Petrocosmea sericea*  
(grown and photographed by Toshijiro Okuto)

In the past several years, *Petrocosmeas* have become popular flower show entries as plants grown for ornamental value:



This *Petrocosmea* collection exhibited by Ben Paternoster was awarded Best in Show at the Long Island Chapter Flower Show in May 2001: *P. minor* (top), *P. 'Momo'* (left), *P. forrestii* (right) (photo by Jeanne Katzenstein)



Group of *Petrocosmeas* exhibited by various growers at the Convention 2004 Flower Show: (left to right, top to bottom) *P. parryorum*, *P. nervosa*, *P. kerrii*, *P. sericea*, *P. duclouxii* (? *grandiflora*), *P. begoniifolia*, *P. minor*, *P. forrestii*, *P. rosettifolia* ?, *P. barbata* (photo by Dale Martens)

# How I Grow Petrocosmeas

---

Bill Price <billprice@telus.net>

2909 Mathers Ave., Vancouver, BC, V7V 2J7 Canada

This genus of Asian gesneriads is a particularly interesting one to grow. Not only do *Petrocosmeas* make lovely displays of flowers, but they also have beautiful foliage textures and sculptured growth patterns. I grow the following species: *Petrocosmea barbata*, *begoniifolia*, *duclouxii*, *flaccida*, *formosa*, *forrestii*, *kerrii*, *menglianensis*, *minor*, *nervosa*, *parryorum*, *sericea*, sp ? '*rosettifolia*', "sp. #5" (seems like it may be a variant of or closely related to *P. minor*), "G25KC00", sp. HT1, and sp. HT2.

All the species that I grow (and *Petrocosmea* 'Momo', the only hybrid known) are essentially low-light plants and do well under two-tube fixtures. I find that they prefer being placed at the ends or sides of the shelves as long as the lights are on for at least 12 hours per day. They will also do well in bright windows, without baking sun, such as in a bright northeast exposure, or set back from a west- or south-facing window. The tight rosette-forming species, such as *P. begoniifolia*, *forrestii*, and *minor*, tend to grow flatter and more symmetrically under fluorescent lights. The more open-growing ones, such as *P. kerrii* and *P. parryorum*, do equally well in natural light. All seem to prefer slightly cooler conditions, especially in winter. The temperature range I grow them in is roughly 16-22°C (61-72°F) in winter and 19-26°C (66-79°F) in the summer. They will tolerate even lower winter temperatures.

*Petrocosmeas* prefer to dry out between waterings, with an even more pronounced drying period in the winter. Even if one can't give them the cool winters they like, I find that drying out between waterings helps produce a better show of flowers. Along with the need for dryness is the need for a very open, well-drained mix. Mine is 1/3 each (by volume) of reconstituted New Zealand sphagnum moss pellets (peat would do as well), vermiculite, and perlite, to which I add some lime. I do not grow my *Petrocosmea* plants covered or wicked, but am aware that some growers do. If one does grow them wicked, I would suggest an even more open mix with a greater percentage of perlite added. For fertilizer I use a weekly rotation of several commercially available ones at 1/4 the regular monthly strength. For most brands, this works out to be 1/4 tsp/gal/week. Leaching of the pots is done roughly every month or two. I fertilize about once a month in the winter.

I keep my *Petrocosmeas* in quite small pots until the expanding rosette grows over the pot rim, at which time I move it up. I find that this keeps the rosette flatter, whereas the plant will tend to mound up if left too long in a small pot and the leaves grow too far past the pot edge. If mounding occurs, I remove several layers of outer leaves before repotting the plant (now a flat rosette). I use shallow pots: either azalea or bulb pans, preferably.

Propagation from suckers and from leaves is easy for most species. Let the newly cut leaves or suckers dry out (callous) for about an hour before planting them to minimize rotting. I keep the leaf propagation tray only partially covered to prevent rot, and I use pure vermiculite as a prop mix, keeping it "just moist", not sodden. Some species, especially those with fuzzy leaves like *Petrocosmea sericea*, are more difficult to propagate from leaves and are prone to rotting if kept too moist.

Although I understand that some *Petrocosmeas* are primarily spring bloomers, I find that under my conditions flower production of the different species is variable throughout the year. Some (e.g., *P. flaccida*, *forrestii*, *minor*, and *nervosa*) will have several cycles of bloom. Others, such as *P. kerrii* (whose white blooms are on very short pedicels under the lower leaves), will bloom sequentially over a period of several months. *Petrocosmea sericea* has not yet bloomed for me. I definitely would encourage everyone to try growing some of these fascinating plants.

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## Coming Events

**April 23 — Washington —** Puget Sound Gesneriad Society and Seattle AV Society joint show and sale at the Center for Urban Horticulture, Seattle. Open to the public on Saturday from 12:00 Noon to 4:00 pm. Growers need not be members to enter the show. Contact Show Chair M.J. Tyler <tippea@earthlink.net> or (360-779-3101).

**April 30 - May 1 — New York —** African Violet & Gesneriad Society of Western New York first dual judged show of African Violets and Gesneriads "Romancing the Violet" at the Walden Galleria Mall, Walden Ave., Cheektowaga. Saturday sales 9:30 am (show 11:00 am) to 9:00 pm; Sunday 10:00 am to 5:00 pm. Free admission. Demonstrations and education. Contact Holly Pohl <Coralbells51@aol.com>.

**May 14 — Vancouver, BC, Canada —** Vancouver African Violet & Gesneriad Society 44th annual show and sale at VanDusen Gardens, Floral Hall, 37th & Oak St., Vancouver. Saturday 1:00 to 4:00 pm. Admission \$2.00. Contact Arleen Dewell <arleendewell@shaw.ca>.

**June 4 — California —** American Gesneriad Society of San Francisco plant sale at the San Francisco County Fair Building, 9th Ave. and Lincoln Way, San Francisco. Saturday from 10:00 am to 3:30 pm. Contact David Waugh <dhwah@sbcglobal.net>.



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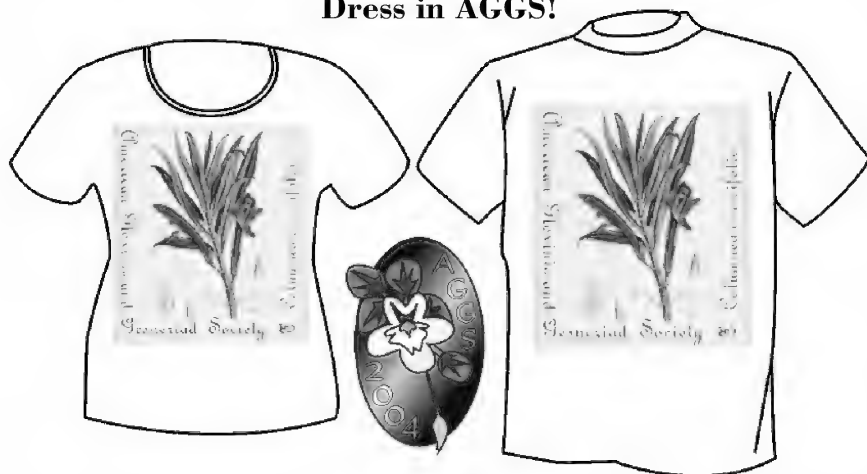
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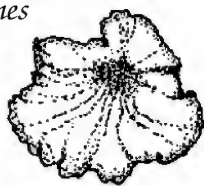
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# American Gloxinia & Gesneriad Society, Inc.

## Financial Statement – January 1, 2004, to and including December 31, 2004

### GENERAL FUND – Combined Receipts, Checking and Savings

Membership	25,170
Promotions	1,719
Ads in THE GLOXINIAN	1,112
Educational / Slide Programs	560
Sales of Literature, including PO	1,256
Seed Fund Sales	6,202
Judging Schools	327
Judging Publications / Appraisal	942
Donations – Fund for Progress / Convention	4,936
Donations – Color Photo Sponsorships	2,083
Miscellaneous Receipts	2,925

Total Combined Balances **\$47,232**  
(Checking \$23,445 / Savings \$23,776)

### GENERAL FUND – Checking Account

Checking Account – Beginning Balance, December 31, 2003	13,659
Added from Combined Balances Above	23,445
Held for Expenses	25,184
Held for Convention Expenses	37,476
From Savings for FBEF CD at Wa Fed	15,000
Bond Redemption – Gen Fund / Safeco (2)	18,472
Bond Redemption – FBEF / Safeco (2)	48,411

Total Receipts – Checking Account **\$181,647**

### DISBURSEMENTS

Publication of THE GLOXINIAN	(27,462)
Other Publications – <i>Appraisal</i>	(641)
Slide Programs	(226)
Membership Processing	(930)
Promotions	(1,409)
Operating Expenses:	
Chair Expenses	(907)
Stipends	(2,400)
Liability Insurance & Umbrella	(4,406)
Grant	(2,000)
Donation to Selby Botanical Gardens	(1,200)
Miscellaneous	(1,950)
Convention Expenses	(57,814)
CD to Wa Fed for FBEF	(48,411)

Total Disbursements **(149,756)**

Balance, Checking Account – December 31, 2004 **\$31,891**

### GENERAL FUND – Savings

Beginning Balance – December 31, 2003	18,936
From Combined Balances Above	23,776
Convention Gross, Less Fund for Progress	49,156
Endowment #2 – Frelinghuysen Arboretum Chapter	2,000
Miscellaneous	116
Total Receipts	93,984

### Disbursements

Credit Card Fees and Supplies	(1,437)
Bank Fees, Supplies, and Members NSF	(192)
Convention Refunds	(505)
Convention Expenses to Checking for Remits	(37,776)
Remits to Checking for Payment of Expenses	(40,184)
To Wa Fed for Endowment #2 CD	(1,950)
Miscellaneous	(40)

Total Disbursements **(82,084)**

Balance, Savings Account – December 31, 2004 **\$11,900**

**GENERAL FUND**

Checking Account	31,890	
Savings Account	11,900	
Endowment Fund #1 – Crisafulli Family	2,014	
Endowment Fund #2 – Frelinghuysen Arboretum Chapter	1,987	
Total, General Fund – December 31, 2004		<b>\$47,791</b>

**ELVIN McDONALD RESEARCH ENDOWMENT FUND**

Balance – December 31, 2003	19,542	
Donations – Convention Silent Auction	1,571	
Donations – Screensavers	1,247	
Interest – Savings Account	13	
Interest – CD #1 @ 5.09% APY held at Key Bank	637	
Interest – CD #2 @ 3.50% APY held at Wa Fed	80	
Balance – Savings Account	7,463	
Balance, CD #1	13,131	
Balance, CD #2	2,496	
Ending Balance – December 31, 2004	23,090	<b>\$23,090</b>

**GESNERIAD REGISTER FUND**

Beginning Balance – December 31, 2003	14,608	
Sale of Registers	216	
Interest – Savings Account	13	
Interest – CD #1 @ 3.00 % APY held at Wa Fed	269	
Balance – Savings Account	5,871	
Balance – CD #1	9,235	
Ending Balance – December 31, 2004	15,106	<b>\$15,106</b>

**FRANCES BATCHELLER ENDOWMENT FUND**

Beginning Balance – Combined, December 31, 2003	190,076	
Change in Value – Fidelity Asset Manager	2,704	
Change in Value – Safeco Mutual Funds (2)	1,142	
Redemption of Safeco Mutual Funds (2)	(48,411)	
Purchase of CD #5 @2.55% APY Bank of America	48,411	
From Savings for CD Purchase	(15,000)	
Purchase of CD #6 @4.10% APY Wa Fed	15,000	
Life Memberships	2,700	
Convention Auctions	5,002	
Donations	558	
Interest Earned to December 31, 2004		
Savings Account	28	
CD #1 @ 3.67% APY held at Key Bank Direct	1,639	
CD #2 @ 2.75% APY held at Wa Fed	131	
CD #3 @ 5.00% APY held at Wa Fed	930	
CD #4 @ 5.00% APY held at Wa Fed	558	
CD #5 @ 2.55% APY held at Bank of America	304	
CD #6 @ 4.10% APY held at Wa Fed	153	
Balances as of December 31, 2004		
Savings	6,842	
Certificate of Deposit #1	46,289	
Certificate of Deposit #2	4,885	
Certificate of Deposit #3	19,522	
Certificate of Deposit #4	11,724	
Certificate of Deposit #5	48,715	
Certificate of Deposit #6	15,153	
Fidelity Asset Manager – Mutual Fund	52,795	
Total Combined Balances – December 31, 2004	205,925	<b>\$205,925</b>

**TOTAL AGGREGATE BALANCES – DECEMBER 31, 2004****\$291,912***– Helen M. Bortvedt, Treasurer*



# Perfume Flowers in Gesneriaceae and their Pollination by Euglossine Bees

Stefan Vogel, Werner Huber & Anton Weber  
Center of Botany, Rennweg 14, A-1030 Vienna, Austria

Observations about insects and other animals visiting flowers are immemorial. The question, why they do that, was answered only 200 years ago. It was the German school teacher and philologist Christian Konrad Sprengel, who in his epoch-making book "The discovered secret of nature in the structure and fertilisation of flowers" (1793, title translated), presented a scientifically sound explanation. Animals do not visit flowers because of their beauty or other fine attributes, but in expectation of receiving a stalwart reward. When the reward is exploited during the visit, the animals unintentionally supply the need of the flowers: transfer of pollen and fertilisation. Sprengel recognized two essential kinds of rewards: nectar and pollen (and additionally: deceptive simulation of one of the two).

For more than 150 years these two had remained the only known rewards and, in fact, most animal-pollinated flowers can be attributed to one of the two categories: nectar-flowers or pollen-flowers. This also applies to the flowers of Gesneriaceae. The bulk of species has nectar-flowers, secreting nectar by a ring-shaped disc or by one to several nectary glands at the flower bottom. Pollen-flowers are clearly in the minority; these do not produce nectar and offer only a share of their pollen.

In the last 50 years, however, exciting new discoveries have been made. Floral rewards came to light which had not been recognized before. One of them is perfume which is actively collected by the male individuals of a special group of bees: the euglossine bees (Euglossini or euglossines, often also called orchid bees). This discovery also alludes to particular gesneriads: a few species of the tribe Gloxinieae use euglossines as their exclusive pollinators.

The exciting partnership of the highly specialised gesneriads and euglossine bees is outlined and illustrated in the following.

## The flowers —

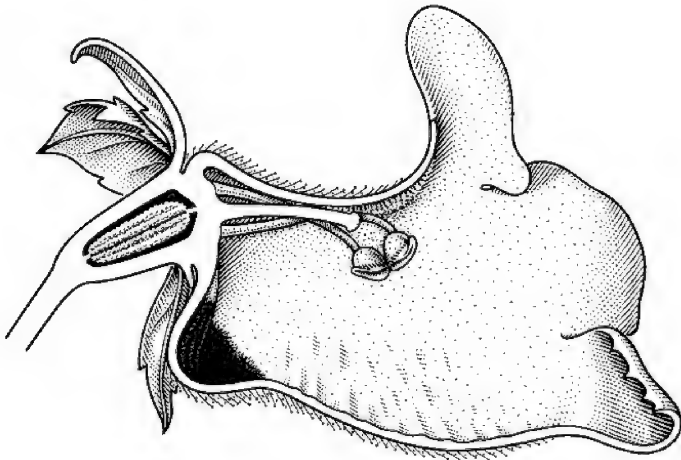
At first it must be pointed out that the term "perfume flowers" must not be equated with "fragrant flowers". For a long time, the flowers of Gesneriaceae were regarded to be completely scentless. Only in recent years scent-production has been recorded and documented in a number of (mainly neotropical) gesneriads. A survey has been presented by John Boggan in *THE GLOXINIAN* (Boggan 1996). Though there is no doubt that the fragrant flowers are addressed to pollinating animals and serve for attraction, the fragrance serves only as a long-distance signal and "signpost" which signal that the flower offers a reward. The reward is usually nectar, and it is the nectar which is actively collected. In contrast, in true "perfume flowers" it is the fragrant perfume itself that is collected.

Such flowers were first recognized in heavily fragrant orchids. Dodson & Frymire (1961) observed that these flowers attract exclusively male euglossine bees, and that the bees exhibit an unusual behaviour: they brush certain parts of the flower lips. At that time, no explanation for the strange

movements could be provided. Shortly afterwards it was discovered that the bees brush off and harvest scent substances produced by the flowers (Vogel 1966). The fragrant substances are then transferred to the middle legs during a short intermittent flight, and stored in conspicuous containers of the hind legs. Finally, they are apparently volatilized by wing movements at certain localities.

In addition to the orchids, a single dicotyledonous species was also discovered to have perfume flowers: *Gloxinia perennis* (Vogel l.c.). We know today that *Gloxinia* and Gesneriaceae, respectively, are not the only dicotyledons that produce perfume flowers. They also occur in the Solanaceae (nightshade family) (in the genus *Cyphomandra* - tree tomato), and in the Euphorbiaceae family (in a few species of the genus *Dalechampia*). With regard to Gesneriaceae, knowledge has not increased very much. Apart from some close relatives of *Gloxinia perennis* (5 or 6 species of *Gloxinia* sect. *Gloxinia*), only a second genus has come to light that apparently produces perfume flowers: *Monopyle* (Wiehler 1983).

In contrast to nectar-producing flowers, the nectary is completely reduced in *Gloxinia perennis* and *Monopyle*, and replaced by a so-called "osmophore". Anatomically, the osmophore consists of palisade-like epidermal cells that secrete tiny droplets of terpenes, and a thick layer (of ca. 8 cell layers) of parenchyma cells densely stuffed with starch grains. During emission of the fragrance, the starch gradually disappears and is apparently involved in the synthesis of the fragrant substances. The surface of the osmophore is purple-brown, smooth and shining. The terpene droplets are only visible with a strong lens.



Length section through flower of *Gloxinia perennis*  
showing the osmophore in the basal pouch (from Vogel 1966)

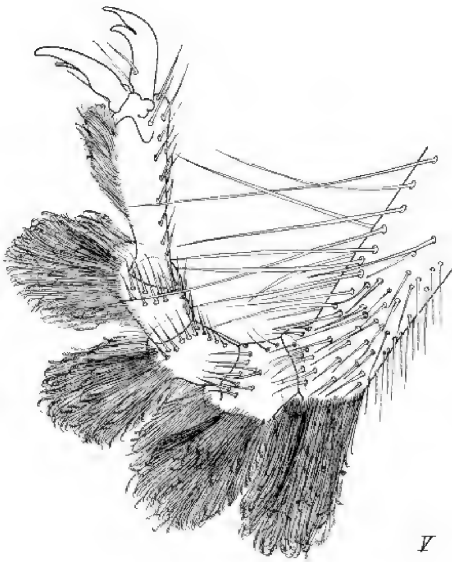
## The bees —

It must be remarked in advance that, as is usual among bees, both the male and female individuals of the euglossine bees take up nectar from a wide array of flowers in order to meet their energy demand. The females also collect pollen for feeding their brood. However, the males additionally visit the special group of perfume flowers in order to collect the fragrant compounds.

Euglossine bees are related to bumblebees. Their name is derived from the Greek *eu* = true, proper, veritable, and *glossa* = tongue. In fact, the tongue is longer than the body and reflexed below the body during flight, and this is an indicative character of the group. There are five genera with nearly 200 species altogether: *Euglossa* (over 100 species), *Eufriesea* (over 50), *Eulaema* (13), *Exaerete* (4) and *Aglae* (1). With the exception of *Eulaema*, these bees can be recognized at once by their brilliant bronze, green, blue or red metallic colors. The reflective or metallic coloration does not result from pigments, but from light interference of the layered cuticle. In contrast, the *Eulaema* bees are larger in size, do not exhibit metallic colors, and have a densely hairy abdomen with often conspicuously striped segments.

The male euglossines are specially adapted for collecting, storing and transporting the grouped goods. In fact, the physique of these bees represent one of the most striking and most exciting adaptations of insects. It is suggestive to regard the partnership of euglossine bees and perfume flowers as the result of a long history of interaction; it must be noted, however, that the euglossine bees also collect fragrances from other sources such as dead wood and overripe fruits, and that possibly only the flowers are adapted to the bees, but not the bees to the flowers.

The peculiarities in the bees' physique concern all three pairs of legs: the fore legs bear a "tarsal brush", the middle legs a "basitarsal comb", and the hind legs a conspicuously inflated tibia, the "(hind) tibial organ".



Tarsal brush of male  
*Eulaema longipennis*  
(from Vogel 1963)

*V*



Male of a species of *Euglossa* subgen. *Glossura*; note metallic-colored surface, long, recurved tongue and tibial organs on the hind legs (photo by S. Vogel)



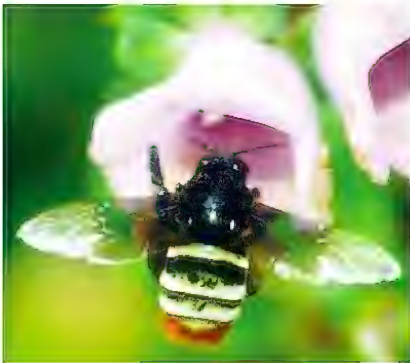
Cinéol-soaked pad of cottonwool attracting euglossine bees (two species of *Euglossa*) (photo by S. Vogel)



Flower of *Gloxinia perennis* in front view showing the dark purple-brown osmophore at the base (photo by A. Weber)



*Monopyle* cf. *macrocarpa*, flower in front view showing the orange osmophore (photo by A. Weber)

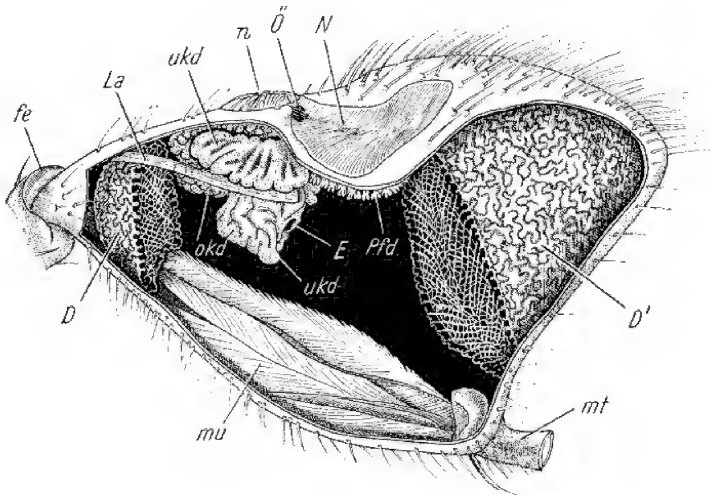


Male *Eulaema meriana* having just landed on the flower of *Gloxinia perennis* (photographed in Costa Rica by W. Huber)



Male *Eulaema meriana* inside the flower; note tibial organs on its hind legs (photographed in Costa Rica by W. Huber)

To better understand these terms, one has to learn that the legs of bees and other insects are made up of several constant segments: the coxa ("hip", closest to the insect's body), the trochanter, the femur, the tibia, the basitarsus and the tarsus. The latter, farthest from the insect's body, consists of four segments. In the male euglossine bees, the tarsal segments of the fore legs bear dense long hairs which function as a brush or mop. The middle legs bear two significant functional structures: a groove (notch) and a comb- or weir-like structure. The most complicated structure is the "tibial organ" of the hind legs. Its anatomy was studied first by histological methods in *Euglossa tridentata* (Vogel l.c.), and more recently by means of Scanning Electron Microscopy in *Euglossa cordata* (Eltz, 1997; for SEM-pictures and brief explanations see <<http://www.uni-duesseldorf.de/MathNat/Zoologie/eltz/morphology.htm>>). The hind tibial organ is essentially a cuticular sac. It represents a voluminous invagination of the exoskeleton that fills almost the entire tibia and is connected to the outside by a short tube. The invaginated cuticle is heavily folded and produces dense stands of branched, tree-like hairs, thus creating a sponge-like structure with a huge concealed surface area. The most complicated part of the hind tibial organ is its interface with the outside. In a recent SEM study, Sager (2004) compared the structure of the hind tibial organ in all five euglossine genera. He found a surprising amount of variation concerning the container interface, size and structure of accessory invaginations, and the form of associated hairs. However, he also identified structural features that were common to all species, suggesting common functional principles.



Drawing of hind tibial organ of male *Euglossa cordata*, frontal part removed to show the spongy interior (D, D') where the fragrance is stored, the muscles (mu) and different glands (okd, ukd) (from Vogel 1966)



The male euglossines collect the fragrant compounds in a way analogous to that of 'enfleurage', an extraction process widely used in the perfume industry (Whitten et al. 1989). First, the bees apply to the fragrant surface a drop of fatty lipids from their labial glands. The fragrance compounds secreted by the osmophore become dissolved in the lipids. The solution is mopped up by the bee using its tarsal brushes and making brushing movements with the fore legs. Next, the mixture is stripped off by the interplay of the comb and the notch at the middle legs (this is done during a short intermittent flight) and finally transferred onto the surface of the hind tibiae with the help of the mid-legs. Here, the liquid is absorbed, retained and perhaps chemically modified by secretory glands within the hind-tibial organ. The details of deposition and absorption of the liquid are still not completely understood.

An important question remains to be answered: why do the male euglossines collect the fragrant compounds? The details are still to be discovered. The main purpose, however, seems clear. The male bees use the (modified) fragrant compounds for the attraction of females (Vogel 1966). At present, this topic is studied in detail by M. Whitten (Florida Museum of Natural History), D. Roubik (Smithsonian Tropical Research Institute), T. Eltz (University of Würzburg), and others. It was found that individual males continuously forage for scents over much of their long lives and finally accumulate large quantities of complex blends. As fragrances are hard to come by, it can be hypothesized that they serve as indicators of male quality (viability, survival) and are judged by female bees prior to mating.

Mating takes place in small territories that are established by males around the stems of small trees in the forest. Here, the males show a typical display behavior that involves frequent landings on the perch, short inspection flights to the nearby neighborhood and ventilation with the wings. It can be assumed that females prefer to mate with males that have rich and sexy bouquets. Thus it can be presumed that the behavior of fragrance collection has evolved through sexual selection.

Cage experiments, documentation of matings by means of high-speed video, single-frame analysis, and fluorescent dye application demonstrate that the bee behaviour involves several morphological structures of hitherto unknown function and suggests transfer of substances from the hind tibia to a contralateral mid tibial tuft of hairs. Deposited on the mid tibial tufts, the fragrances are ideally placed to become ventilated by jugal combs on the wing bases. These findings strengthen the view that the volatiles serve as signals in the context of mating behavior, as originally suggested, but many details are still to be cleared.

Euglossine bees are an exclusively neotropical group of bees, occurring mainly in Central and northern South America. In their essential habitat, the rain forest, they are rarely seen. But there is a trick to attract male euglossines: hang up a dabber (cotton swab) or piece of cottonwool soaked with cineol, methyl salicylate or vanillin. There is a good chance that within a few minutes a number of different species will fly around the scent source.

With regard to *Gloxinia perennis*, to our (perhaps incomplete) knowledge, only species of the genus *Eulaema* have been observed to visit the flowers. These bees have the appropriate size for ensuring effective pollination while most species of the other genera are too small to touch the anthers on the corolla roof when visiting the flower. The first observations refer to

*Eulaema nigrita* in NE Brazil (Vogel 1966). Here another species is recorded and documented: *E. meriana*. These observations were made in Costa Rica, in the botanical garden of the "Tropenstation La Gamba", where *Gloxinia perennis* is cultivated. Because of easy cultivation, the terrestrial habit and the frequent visitation by *Eulaema*, the plants are most suitable to demonstrate perfume flowers and their pollination by euglossine bees to students and visitors of the garden.

If you grow a *Gloxinia perennis* or *Monopyle macrocarpa* (for which, unfortunately, no field observations are available so far) remember the exciting adaptation of its flowers to the strange and magnificent euglossine bees. This is really one of the most astonishing mutual relationships of organisms that evolution has generated.



*Gloxinia perennis*, habit of (cultivated) plants (photo by A. Weber)



*Monopyle* cf. *macrocarpa*, plant in its natural habitat in Valle Virgen, Costa Rica (photo by A. Weber)

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